Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Redevelopment of Spectrum to	)	ET Docket No. 92-9
Encourage Innovation in the	)	
Use of New Telecommunications	)	
Technologies	)	
	)	
and	)	
	)	
NTIA Report on 1710-1850 and	)	
2200-2290 MHz bands	)	

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

COMMENTS

GTE Service Corporation, on behalf of
its domestic affiliated telephone,
equipment, and service companies

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SUMMARY

GTE agrees new wireless technologies will have a dramatic impact on the American people and the economy. Thus, GTE supports the FCC's goal to establish a large spectrum reserve that could be used for emerging technologies. These technologies could bring valuable new services to the American public in spectrally efficient ways. However, before any allocation is made for a particular service, the Commission must convince itself that demand for that service exists and that such an allocation is in the public interest. Spectrum is a scarce resource that must be allocated wisely.

Assuming demand can be substantiated, the question then becomes where should the spectrum reserve for emerging technologies be located. The FCC's Staff recommended the 1.85-2.2 GHz band. GTE recommends that the Commission consider all technically compatible spectrum. For example, the Government 2 GHz band should be included in the review and GTE notes the FCC has already indicated to Congress its intent to do so. The 2.50-2.69 GHz band should also be investigated. AT&T has also reported success with personal communications service experiments at 6 GHz and the FCC may wish to include this band in its review.

If the FCC concludes that some incumbent users must be relocated from existing spectrum and different frequencies will be utilized, then all alternative higher frequency bands should be examined to determine potential new homes for the displaced users. GTE is particularly concerned that in reviewing higher bands existing services such as the satellite services not be adversely impacted by any reallocation decisions. GTE also urges the FCC to require a strict technical demonstration of "claims" that spectrum can be shared without causing interference to current users. In some cases interference may only be resolved by having the incumbent relocate. However, the FCC may also conclude that many facilities can continue operating at 2 GHz well into the next century since the new operations can exist in vacant spectrum and not adversely impact

incumbent facilities. Facilities should be analyzed on a case-by-case basis to determine their proper treatment. If facilities need to be relocated, some may go to other media and some may move to higher frequencies. The final decisions will be influenced by cost, reliability, and other criteria. Since cost is one driver of the Commission's policy choices, the Commission should refine its cost data since GTE's review demonstrates that many significant cost elements have not been included.

To help ameliorate cost impacts for those users who may be required to move, GTE supports the use of tax certificates for the amount of compensation received representing the full cost of the move that is invested for new facilities. These certificates should be used as an incentive and should be available for moves to higher spectrum as well as moves to other media. Since the tax certificate covers only the full cost of the move and not any compensation in excess of this cost, this will help to minimize any tax windfall. In addition, there will be an upper limit to any potential windfalls due to other technical options available to new entrants.

Thus, GTE supports the FCC's goal of a large spectrum reserve for emerging technologies, but only if the concerns raised by GTE are addressed.

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COMMENTS

GTE Service Corporation, on behalf of its domestic, affiliated telephone, equipment, and service companies ("GTE"), offers its Comments in response to the FCC's Notice of Proposed Rulemaking ("NPRM" or "Notice") released February 7, 1992, FCC 92-20.[1] In the Notice, the FCC proposes "to establish new areas of the spectrum to be used for emerging telecommunications technologies." (NPRM, para. 1) Specifically, the Commission has identified 220 MHz of spectrum between 1.85 and 2.2 GHz for these emerging technologies. The Commission advised that it has also proposed a regulatory framework to enable existing fixed microwave users in these bands to relocate to other fixed microwave bands or alternative media by the use of a flexible negotiation approach that permits financial arrangements between incumbents and new service providers during an extended transition period. (Id.)

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1 By an Order Extending Time for Comments and Reply Comments, released April 1, 1992 (DA 92-398), the Office of Engineering and Technology ("OET") extended the Comment date until June 5, 1992 and the Reply Comment date until July 6, 1992.

By Public Notice dated May 4, 1992 the Commission also requested Comments on a March 1992 report entitled, Federal Spectrum Usage of the 1710-1850 and 2200-2290 MHz Bands, published by the Department of Commerce, National Telecommunications and Information Administration ("NTIA") ("NTIA Report") and made a part of this Docket file.

BACKGROUND

As a result of technological advancements in digital and signal processing systems in recent years, new possibilities for advanced radio communications services have emerged. The Commission currently has pending before it a number of requests for new services and technologies for which sufficient spectrum is unavailable. As stated in the Notice (para. 4), these requests include:

- 200 MHz for new personal communications services ("PCS");
- 40 MHz for data PCS;
- 33 MHz for generic mobile-satellite service;
- 70 MHz for a digital audio broadcasting service; and
- 33 MHz for low-Earth orbit satellites ("LEOs").

Additional requests for spectrum are arriving at the Commission on an almost daily basis. As the Commission advised Chairman Hollings of the Senate Committee on Commerce, Science and Transportation:

> The United States is facing a severe spectrum shortage. There is not enough spectrum to satisfy demands for new services, so the primary issue before the Commission is finding ways to strike a balance that will

> accommodate new technologies while ensuring that existing users can maintain and enhance the quality of their present operations.[2]

The Commission has authorized numerous experiments for PCS-type technologies and many parties are claiming to be "pioneers" of this yet-to-be-defined service. In March 1992 the World Administrative Radio Conference ("WARC") of the International Telecommunications Union identified global bands 1885-2025 and 2110-2200 MHz for Future Public Land Mobile Telecommunications Systems. Specific personal communications services are currently being developed in other countries and the governments of those countries are allocating spectrum for such services. For example, Europe and Japan have moved to allocate spectrum between 1 and 3 GHz for mobile services that use new technologies. As stated in the Hollings Letter, p. 2:

> Japan has allocated 100 megahertz (MHz) and is considering an additional 400 MHz in this range for new mobile services and emerging technologies. The United Kingdom has allocated 174 MHz, and the European Community is considering the allocation of up to 320 MHz for similar purposes.

In this country, Cellular demand is rapidly moving from vehicular units to portable terminals with most new units being hand-held. Cordless telephone technology is becoming available in offices and wireless Private Branch Exchanges ("PBXs") and wireless Centrex services are beginning to emerge.[3] Many of the PCS experiments are testing a Telepoint-like capability -- often referred to as "wireless payphones." Although Telepoint units are usually deployed for call origination service only, these units can also contain paging capabilities to provide a form of two-way communication.

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2 See Commission letter dated April 20, 1992 to the Honorable Ernest F. Hollings, Chairman, Committee on Commerce, Science and Transportation, United States Senate, p. 2. ("Hollings Letter")

3 For example, the May 29, 1992 issue of Communications Daily, p. 8, reports: "US Sprint introduced new phone system, Premier Microcel, operating as digital wireless key phone system that can function as standalone or behind PBX or Centrex."

A quick survey of other activities demonstrates that wireless technologies are getting a lot of attention. Standards are being developed in the Institute of Electrical and Electronics Engineers, Inc. ("IEEE") 802.11 activity for Wireless Local Area Networks with data rates up to 20 Mbits/s and the potential for packetized voice.[4] U.S. Standards Committees TR-45, T1E1, T1P1, and T1S1 are developing wireless standards, including PCS standards.

The Rutgers University Wireless Information Network Laboratory is studying third generation systems based on Metropolitan Area Networks as a backbone for interconnecting flexible wireless access ports with more conventional fixed telecommunications networks.[5] Bell Communications Research Inc. ("BellCore") has proposed a wireless local loop concept and is working on architectures to control routing of calls to various low power radio ports.[6] Research is also being carried out on new technologies in Japan[7] and Europe.[8] A number of satellite systems have also been proposed to provide a role in reaching people or machines anywhere.[9]

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4 See Rypinski, C.A., "IEEE 802.11 Standards for RLAN," Virginia Tech Symposium on Wireless Personal Communications, June 3-5, 1991, pp. 3.1-3.7.

5 See Goodman, D.J., "Second Generation Wireless Information Networks," IEEE Transactions on Vehicular Technology, May 1991, pp. 366-374.

6 See Cox, D.C. Arnold, H.W., Porter, P.T., "Universal Digital Portable Communications: A System Perspective," IEEE J S A C, Special Issue on Portable and Mobile Communications, June 1987, pp. 764-773.

7 See Nakajima, A., et al., "Intelligent Digital Mobile Communications Network Architecture for Universal Personal Telecommunications (UPT) Services," IEEE VTC May 19-22, 1991, St. Louis, MO, USA, pp. 83-87; and Tanaka, K., et al., "Signalling Architecture for Microcell Communications Systems," IEEE VTC May 19-22, 1991, St. Louis, MO, USA, pp. 240-244.

8 The Research into Advanced Communications in Europe ("RACE") program is studying the requirements to provide a Universal Mobile Telecommunications System ("UMTS") which consists of individual mobile and cordless services all working to a common standard.

9 The most recent was the proposal by CELESAT which contemplates a Hybrid Personal Communications Network ("HPCN") consisting of two geosynchronous satellites and a terrestrial network. (See RM-7927)

Thus, given the worldwide and domestic activities related to new emerging technologies, it is understandable that the FCC concludes that it "is in the best interest of the United States to make spectrum available for the development of new services and technology." (NPRM, para. 6) To this end, the Commission had its Staff conduct a study to examine the possibility of creating emerging technologies bands.[10] Many of the proposals in the Notice are based on the recommendations of the OET Report.

DISCUSSION

GTE applauds the FCC's goal to establish a large spectrum reserve for emerging technologies which can be used to provide new services to benefit the American public.

GTE supports the Commission's goal to establish a large reserve of contiguous spectrum that can be used to enable new radio-based technologies. By using this resource in spectrum efficient ways, new services can be created to benefit the American public and the economy. As noted by the Commission, Japan, countries in Europe and other administrations are taking similar steps to accommodate new services and technologies. The OET Report identified 36 administrations that have -- as of October 1991 -- expressed an interest in establishing non-fixed allocations in the 1 to 3 GHz band. (OET Report, p. 4, footnote 6)

In the past, the scarcity of spectrum has delayed bringing innovative new services to the public. GTE Airfone made its first request for spectrum for an air-to-ground service for commercial aircraft in 1979.[11] However, it was not until eleven years later in 1990 that the FCC first allocated spectrum for this service and licensed providers on other than an experimental basis.

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10 See "Creating New Technology Bands for Emerging Telecommunications Technology," FCC/OET TS92-1 (January 1992) ("OET Report")

11 See Petition for Rulemaking, RM-3524, filed by Airfone, Inc., October 25, 1979.

The Commission is well aware of the delays in bringing the benefits of Cellular service to the American public. A study by the National Economic Research Associates ("NERA") estimates that the delays in authorizing and licensing Cellular telecommunications cost the U.S. economy $86 billion.[12]

However, as the FCC mentions in the Notice, and Commissioner Barrett discusses in his Separate Statement, the Commission has more requests for spectrum than it has identified for the reserve. Quoting Commissioner Barrett:

> I note that the Commission already has received requests totaling more than 370 MHz for new services and technologies ... . Such requests clearly exceed the 220 MHz being examined in this Notice. Thus, I think it is important that, while the Commission proceeds with this docket, we also remain abreast of ongoing legislative efforts taking place between Congress and the National Telecommunications and Information Administration to identify additional spectrum for commercial uses.

If the demand for all these new services can be substantiated, and the Commission acts to satisfy that demand, then the Commission will need to identify still more spectrum. However, for any new request, GTE urges the Commission to proceed with caution and develop a complete record before actually allocating precious spectrum. Although delay in making decisions can have economic consequences, haste in making ill-advised decisions can also have dire consequences.

Demand should be substantiated before any final allocations are made.

In early 1989 the acronym "PCN" for Personal Communications Networks first appeared as the United Kingdom sought to proliferate wireless services to the public. The January 26, 1989 announcement to Parliament by the British Secretary of State

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12 See Communications Daily, November 18, 1991, p.5. Also see Testimony of Charles L. Jackson, Vice President, NERA, at the FCC's En Banc hearing on PCS in December 1991.

established CT-2 Telepoint licensees, and launched the "phones on the move" initiative which resulted in PCN licensees some 11 months later.

The United Kingdom had ensured that ample spectrum would be available to support these services. Apart from the 50 MHz of spectrum allocated to Cellular, 4 MHz of spectrum had been made available for Telepoint services, and 90 MHz of spectrum within the 1.8 GHz band was ear-marked for PCN. The United Kingdom was also cooperating at this time within the European Community to make additional spectrum available for Digital European Cordless Telephone ("DECT") standard equipment. Twenty (20) MHz was going to be the primary DECT allocation and 30 MHz would be placed in a reserve. Thus, the U.K. with a population of some 56 million persons -- one fifth that of the U.S. -- was headed toward a total allocation of some 194 MHz for "wireless" services. All of these services were backed by reputable companies or consortia having the necessary financial, human, and technical resources to plan, design, procure, install, and operate the large, capital-intensive networks required for service to the public.

What happened? CT-2 Telepoint no longer exists. The final CT-2 Telepoint licensee has still to launch its service. Today, the yet-to-launch PCN providers are proceeding very cautiously to verify market demand before committing huge amounts of capital. Cellular providers, however, continue to serve the premium mobility users.

Given the qualifications of the companies involved in the original process, and the amount of spectrum made available for those services, it becomes apparent that factors other than spectrum availability must have played a significant role in these "emerging technologies" service failures. A major factor was the lack of demand for the services provided. Providing a spectrum reserve will not guarantee successful services using emerging technologies unless they meet the expectations of consumers. Allocation of spectrum, especially in bands where it is currently being used effectively, should not

occur until solid research verifies that a demand for new services exists at a price which is obtainable.

In summary, GTE suggests that the FCC review the U.K. experience and not allocate spectrum to specific services until such time that demand for those services makes allocation of scarce spectrum worthwhile, given the costs of providing those services with the best alternative technology. In this regard, GTE echoes the comments of Commissioner Barrett that: "Proponents of emerging technologies and services should ... justify their particular spectrum requirements" (emphasis added) and Commissioner Duggan that: "when there is any danger of displacing proven communications services in favor of unproven or speculative services, a heavy burden of proof rests upon us." (See Separate Statements of each Commissioner attached to the Notice.)

Assuming that demand for new services can be substantiated, is 1.85-2.2 GHz the right choice to locate the spectrum reserve that will be used to satisfy that demand?

The OET Study set forth five major criteria to select candidate frequency bands for the emerging technologies applications. While acknowledging that the ultimate selection must be based on proven spectrum needs and propagation characteristics required by the new services envisioned, the other factors cited were:

- Cost of equipment. If the spectrum chosen is in a range for which state-of-the-art equipment is not imminently available, then high costs would delay introduction of new services.

- Amount of spectrum. There must be enough spectrum available to allow substantial development and economies of scale.

- Feasibility of relocation. The existing licensees in the target spectrum must be relocatable to alternative media or other spectrum with a minimum of cost and disruption of service.

- Non-government spectrum. In order to avoid the need for coordination and to speed the process of transition, the emerging technologies band should come entirely from spectrum regulated by the FCC.

- International developments. It is desirable for the emerging technologies band to be compatible with similar international developments. The WARC-92 will most likely focus on this spectrum for mobile use.

(OET Report, p. 5)[13]

Applying these criteria, the OET Study eliminated spectrum below 1 GHz and above 3 GHz. The spectrum below 1 GHz was first eliminated since the "majority of these frequencies are already used for broadcast and mobile services that would be difficult to relocate." (OET Report, p. 2) "Frequencies above 3 GHz were also eliminated from consideration, primarily because propagation characteristics in this area of the spectrum are less desirable for mobile operations." (Id.) In this regard GTE notes that AT&T has filed for experimental authority to test PCS-like services at 6 GHz and advised the FCC of these tests at the PCS En Banc meeting. The FCC should evaluate the results of these tests before making any final decisions.[14]

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13 The last two items listed, non-government spectrum and international developments, are an "influence" but should not in GTE's view be weighted as much as the first three. Government spectrum should be included in some phase of this proceeding if not initially, and international decisions involving Canada and Mexico are more important than Europe or the rest of the world. The geographic closeness of our North American neighbors is an important consideration, whereas, global compatibility, although desirable, is not crucial. The FCC concluded as much in its Supplemental Notice of Inquiry in preparation for the WARC released March 20, 1991, para. 24, when it stated: "We agree that compatibility of roaming is important. However, we are not convinced that an exclusive worldwide mobile service allocation is necessary to achieve the desired compatibility." Interim Working Party 8/15 in its Report, Helsinki, Finland, November 12-21, 1991, section 6.3.3.3.1.2, states: "... while a common frequency band is preferred, this may not be immediately feasible. A degree of commonality can be obtained through regional/international compatibility with a common signalling band and sufficient overlap of traffic bands to ensure compatibility to roaming." (emphasis added) There will be a higher volume of roaming with nearby international neighbors in our region.

14 In AT&T's Request for Pioneer's Preference filed May 4, 1992, pp. i-ii, AT&T advised the FCC that "results ... associated with its trial indicate that PCS appears viable at spectrum as high as 6 GHz. Those results indicate the possibility for greater reuse of frequencies at 6 GHz than for systems operating at lower frequencies. AT&T has also successfully completed calls over the air at 6 GHz in both the laboratory environment and at two field locations."

The 2.50-2.69 GHz band should be included in this review.

GTE notes that many parties have urged the Commission to consider other frequencies in the 1-3 GHz band than those proposed. Utilities Telecommunications Council ("UTC") filed on May 1, 1992 a "Petition for Issuance of Further Notice of Proposed Rulemaking" ("UTC FNPRM Petition") requesting the FCC to give serious consideration to the 2.50 to 2.69 GHz band. UTC claims the OET Report's analysis rejecting this band is "flawed." (UTC FNPRM Petition, p. 10) To date, the FCC has not placed the UTC FNPRM Petition on Public Notice or taken any other action with regard to that Petition. While not necessarily agreeing with all the items in that Petition, GTE believes all technically compatible spectrum should be thoroughly analyzed for the emerging technologies bands.

The Government 2 GHz band should also be included in the analysis.

For this same reason, GTE agrees that the Government bands at 1.71-1.85 and 2.2-2.29 GHz should also receive analysis by the Commission. From a review of the NTIA Report, it appears that most of this Government spectrum is presently used for similar point-to-point microwave uses as that spectrum tentatively ear-marked for the reserve in the Notice. While GTE recognizes that some Government applications are classified and, therefore, certain data are not in the NTIA Report, the FCC can and should review all spectrum options as part of this rulemaking. In this regard, it would be helpful if the non-classified Government facilities and applications were summarized and analyzed by the same methodology as was used for the non-Government spectrum, and reported by OET at the same level of detail.

Although OET eliminated the Government 2 GHz band in its study, the Commission has apparently not totally accepted this recommendation. At paragraph 21

of the Notice the FCC asked about the "feasibility" of including this band in the review. GTE believes it is entirely feasible to also study this band, and, given the negotiations between members of Congress and the NTIA concerning freeing Government spectrum for commercial applications, it would be not only feasible but appropriate to include this band. In fact, subsequent to the release of the Notice the FCC advised Congress in the Hollings Letter (p. 2) that:

> [W]e are working with the Commerce Department to gain access for private use of spectrum in the 1710 -- 1850 MHz area that is currently reserved exclusively for Government use. We would welcome the opportunity to work with Congress on this issue through oversight or spectrum legislation.

Since this spectrum borders the bands proposed by the Commission, this Government spectrum provides a natural expansion area should the Commission adopt its NPRM proposals. NTIA also appears to be willing to work with the Commission concerning this spectrum. In its May 4, 1992 letter to the Chairman of the Commission, NTIA stated:

> NTIA also understands the very natural interest of [2 GHz incumbents] in suggesting that bands other than the ones they use, such as federal government bands, be included in the reallocation process the Commission has proposed. NTIA has recently examined federal government spectrum use in the 1710-1850 MHz and 2200-2290 MHz bands, and is actively reviewing alternatives to determine the operational problems that fixed microwave users face in light of the Commission's proposals and what, if any, accommodations of their needs can be made in spectrum now allocated to the federal government. However, this review can take place as the proceeding continues, and we will work with the Commission to accomplish this goal. (emphasis added)[15]

Thus, all spectrum that is technically compatible should be encompassed in this proceeding.

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15 See May 4, 1992 letter from Thomas J. Sugrue, Acting Assistant Secretary, to Chairman Sikes, p. 2.

TECHNICAL COMMENTS ON THE OET REPORT.

Many point-to-point applications are similar.

While GTE must commend the FCC's Staff on the thoroughness of the OET Report, there are some points that need to be adjusted. While the OET is correct that all point-to-point users operating at 2 GHz have widely varying characteristics, there are similarities and differences. For some applications, common carrier point-to-point users require and engineer a more reliable path than private users. Common carriers generally employ more stringent interference criteria. However, some of the other utilities such as power and petroleum utilities may have critical facilities that require a higher reliability than even common carrier facilities.[16]

Public safety users of the 2 GHz band consistently make the point that their communications protect life and property. The reality is that telephone companies and Cellular companies can make the same argument because the calls for the emergency services and most of the communications utilized by the emergency services are actually carried over local exchange carriers' and Cellular carriers' networks. Even for national security, the majority of the Department of Defense communications are carried on the public network. That is not to say that each of these users do not also have some facilities under their direct control that may bypass the public network. The point is, general assumptions lead to general conclusions. What the FCC needs to do is look at specifics.

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16 The Association of American Railroads ("AAR"), in its Petition for Clarification filed March 20, 1992, AAR, page 4, footnote 4, citing 57 RR 2nd 1486, 1501 (1985), states that some private systems must be extremely reliable: "For example the Commission noted that power companies demand a reliability factor of 99.995 percent, which is higher than the level of reliability for most common carrier services."

For example, the OET Report seems to assume that fiber passes every common carrier point-to-point microwave tower, and, thus, is available as an alternative media.[17] The OET Report also assumes that every 2 GHz application can be carried on a higher frequency. GTE has a lot of 2 GHz facilities in very remote and rural areas. Fiber is not there now and may not be for a long while. Some 2 GHz routes use solar-powered repeaters because the towers are so remote commercial power is not available. Solar-powered radiofrequency repeaters do not exist for the higher bands, thus, these facilities could not relocate to higher microwave bands or fiber. Of course, there will also not be much customer demand for emerging technologies in a lonely rural area either![18]

In the Notice at para. 27 the Commission asked for "other approaches" that might lessen the impact on existing fixed microwave systems while ensuring the timely availability of 2 GHz frequencies for new services. If the Commission determines that it will allocate the 2 GHz band for the emerging technologies spectrum reserve, then GTE urges a case-by-case approach be taken for specific facilities. If an alternative media is available economically, it should not matter whether the point-to-point facility is licensed to a telephone company, a Cellular provider, a private operator, a public safety user, a wireless cable operator, or a Government user. For all practical purposes the 2 GHz point-to-point uses and spectrum are interchangeable. For each use, alternative media are more likely to exist in dense urban areas where demand for emerging technologies will also be greater.

In rural and remote areas, the same comparison can be made regardless of the user of the spectrum. A remote facility for a Local Exchange Carrier ("LEC"), a pipeline, or the Department of Defense will share many of the same attributes. This will

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17 There may be environmental impacts of fiber also. If a facility was necessary to cross wetlands or Indian burial grounds, a microwave hop may be the preferred media due to the environmental concern. (See Section 1.1301 et seq. of the Commission's Rules.)

18 Lack of demand in rural areas also forced the U.K. Government to allow its PCN licensees to share infrastructure in rural areas because there was insufficient demand to support multiple infrastructures.

include the fact that there will be limited demand for emerging technologies in remote areas and, thus, probably no reason to ever have to relocate that facility to another media or to a higher frequency. In some very remote areas, the LEC facility may be the only communications facility, thus, it would also carry public safety communications, and, thus, would be the facility protecting life and property.

If a systematic review of facilities is taken on a facility-by-facility basis, GTE predicts the FCC will find that while some facilities could be relocated to higher spectrum or alternative media, other facilities can stay at 2 GHz well into the next century. After this review is undertaken, it may be that those facilities that can make a showing that they should remain at 2 GHz, will be spread throughout the band. With only a minor expense for re-tuning transmitters and receivers, these spectrum uses could be concentrated into a smaller portion of the 2 GHz band, thus, over the transition period providing "clear" spectrum for emerging technologies' uses. This approach to spectrum management will not only share the relocation burden across all users of the band, but also will minimize the relocation costs and preserve for all users those facilities that can and should remain at 2 GHz.

The FCC has already adopted such a case-by-case approach in its recent Public Notice, May 14, 1992, allowing a licensee to make a showing that its current facility should not be shifted to secondary status even for a new frequency addition. There the FCC stated:

> We also believe the conditional secondary status should not be applied in certain situations where additional links may be required to complete a communications network, or where new facilities and/or frequencies are operationally connected to a system, licensed prior to January 16, 1992. In these instances, we will not apply the secondary conditional status when the applicant makes a valid showing of its need for the facilities. (emphasis added)

The same case-by-case approach should be applied to the entire 2 GHz band to determine candidate facilities to be relocated.

The Commission must thoroughly examine alternative higher frequency bands to determine where 2 GHz users can best be accommodated.

GTE recognizes that some 2 GHz facilities may not be suitable for alternative media and may need to be moved into higher frequency bands. Given this possibility, GTE believes that all of the candidate higher frequency bands must be thoroughly examined to identify those bands which can accommodate 2 GHz user requirements without adversely impacting existing spectrum users.

GTE supports maximum flexibility for displaced 2 GHz users, and, therefore, recommends that all available spectrum options be examined. However, GTE has serious concerns with respect to the 4 GHz frequency band insofar as a restructuring of this band could potentially impact existing and future satellite services.[19]

The 4 GHz band currently is structured for wideband channels, while the typical 2 GHz user can probably only show need for a narrowband channel. This would lead to inefficient spectrum use, unless the 4 GHz band is restructured. A restructuring of the 4 GHz band to include narrowband channels could potentially make frequency coordination of C-Band earth stations very difficult in frequency-congested areas. In such areas, earth stations are coordinated to operate in the guard bands between terrestrial services, thereby making efficient use of valuable spectrum. This scheme is particularly useful for satellite broadcast networks, which require that all stations share the same frequency slot. The current guardband slots are often the only place where such broadcast networks can operate without interference. For this reason, GTE believes that

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19 Also see GTE's Comments filed June 1, 1992 on UTC's Petition for Rulemaking, RM-7981, which seeks to reallocate the 4 GHz band from primary to secondary allocation for satellite services.

any proposal to restructure the 4 GHz band must be thoroughly examined to ensure that such restructuring would not involve the adverse effects described herein. If it is determined that a restructuring proposal at 4 GHz would have such adverse affects on satellite operations, GTE would not support a reallocation of this candidate frequency band.

A further consideration for the 4 GHz band is that satellite services have long co-existed with terrestrial services by means of established frequency coordination procedures. If a suitable reallocation scheme can be accomplished at 4 GHz, it is mandatory that all users of this band be required to comply with the frequency coordination requirement.

In addition, GTE has concerns with respect to the 12 GHz band, which has been assigned primarily for Ku-Band earth station downlink services. These earth stations are deployed without the benefit of frequency coordination, and their locations are not tracked by geographical coordinates (addresses are maintained, but not geographical coordinates). Any reallocation proposal would, therefore, need to ensure that there would be no interference potential to existing 12 GHz users, as it would not be economically feasible at this point to establish accurate coordinates for the thousands of Very Small Aperture Terminals ("VSAT") already deployed in order to permit frequency coordination with terrestrial users.

In sum, GTE favors a comprehensive review and examination of all of the higher frequency bands which are potentially available to accommodate the 2 GHz users. To the extent that a proposed reallocation of the 4 GHz or 12 GHz bands may be found to adversely affect existing and future satellite operations, GTE would not support a reallocation of these bands. Instead, GTE favors alternative frequency bands where a reallocation can be accomplished in a more favorable manner to both new and existing spectrum users.

Considering the above points, it appears that the displaced 2 GHz users could more realistically be assigned into one of the following bands: 6.525-6.875 GHz; 10.7-11.7 GHz, 12.7-13.25 GHz and 17.7-19.7 GHz. The highest bands could be used for path lengths shorter than 10 miles. Alternatively, if the FCC includes the Government bands and the 2.5 GHz bands in its review, these displaced services could be relocated to those bands. In looking at the higher bands, existing technical considerations and coordinating procedures should be followed if 2 GHz users are moved into the upper bands.

GTE also believes the current partitions between private and common carrier users should be retained in the higher bands. This will establish the procedural and technical rules for coordination in these partitions. The eligibility or loading criteria could be waived to allow private to apply for common carrier spectrum and vice-versa, however, the coordination procedures and technical rules should remain the same for the partition. In other words, when in Rome, do as the Romans do. When in the common carrier partition, do as the common carriers do (and vice-versa for the private partition). Equipment and channel plans will be required in order to move users to higher bands. The 6 GHz bands have 30 MHz channels, whereas the 2 GHz users currently have 3.5, 5, and 10 MHz channels. Although equipment may not yet exist for the narrower channels, as demand develops, the equipment marketplace will develop the appropriate radio equipment.

The OET Study's cost estimates appear too low.

The OET Report (p. 31) states that:

> To convert a 2 GHz facility to operation on a higher frequency, only the basic microwave communications equipment, i.e., the radio terminal equipment, which includes the transmitter or receiver, the antenna, and the necessary feed lines, would need to be replaced. Other equipment used in 2 GHz operation, for example, towers, back up power

> equipment, alarm systems, and monitoring and control equipment could generally be retained. (footnotes omitted)

The FCC Staff then concluded that: "$125,000 to $150,000 is a reasonable estimate for the average cost of replacing these items for 2 GHz operation." (OET Report, p. 32) In its further analysis the OET Report used the lower end of this range. (Id.) GTE believes the FCC's cost estimates are understated in that all cost issues are not accounted for. Given the congested nature of some of the bands, frequency selection studies and re-engineering may be a reiterative process. There is a procurement cost of new equipment beyond the cost of the hardware. There is employee training, station installation, new test equipment, spares, and probable tower structure fortifications for higher performance antennas for higher frequency bands in addition to FCC fees for license applications.[20] It is interesting to compare the FCC's estimate of $125,000 for replacement of a line-of-sight route with those of NTIA. In Table 5-1 of the NTIA Report, page 5-5, in Footnote b, NTIA states an "assumed ... cost of $250,000 per new station (e.g., for fixed line-of-sight, point-to-point systems)." However, NTIA uses even higher estimates. For example, see Table 5-1, page 2 of 3, on page 5-3, under Fixed Service, where there are estimates ranging as high as $1.5 million for a system.

The OET Report, page 32, also states that the recent growth of Cellular microwave systems "skews the age distribution of the common carrier 2 GHz facilities, so that half of the equipment used in this service is under three years old. The study therefore estimated the average age of common carrier facilities to be only 5 years old." GTE data for its Cellular operations that was provided to the FCC Staff demonstrated that 75% of GTE's Cellular 2 GHz hops were less than 2 years old.

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20 For Price-Cap-regulated companies, any costs the FCC's policies force upon them should be treated as exogenous.

GTE urges the FCC to carefully determine how much spectrum will be placed in the reserve, evaluate all compatible spectrum bands that could accommodate the reserve, and address the cost and technical impacts of its final decision.

While GTE supports the goal of the FCC's initiative to establish a spectrum reserve for new technologies, the Commission must do so after a careful review of all spectrum options and technical and cost impacts. To even determine the size of the spectrum reserve, the FCC must have a tentative idea of the applications and services that will be enabled. Propagation and interference issues need to be well understood to assist in locating the reserve. While the Commission has cited some reasons for wanting to stay under 3 GHz, there are experimental data that may support higher frequencies for some emerging applications or services. The FCC could also conclude that portions of the reserve may exist at both higher and lower frequencies.

In measuring the economic impacts of the proposals, the FCC should ensure it has properly considered all the costs involved. To ameliorate the cost impacts, incentives such as tax certificates or other devices should be used. Finally, before requiring any incumbent to relocate, the FCC must ensure that alternatives are available and suitable. This would include availability of technical criteria and procedural mechanisms to move to higher frequencies as well as an evaluation of costs and reliability at higher frequencies.

COMMENTS ON SPECIFIC NPRM PROPOSALS

GTE supports the use of tax certificates as an incentive to negotiate for spectrum return.

At paragraph 20 of the NPRM, footnote 17, the FCC seeks:

> comment on whether we should award tax certificates to fixed microwave licensees who receive financial compensation from an entity seeking to

> use the spectrum for new technology as part of an agreement to surrender their license and use other, non-radio alternative media. ... We also seek comment on whether the Commission is authorized to grant tax certificates to non-broadcast licensees. See 26 U.S.C. Sec. 1071. In this regard, we also request comment on the applicable precedent that could support the use of tax certificates in this proceeding. (case citations omitted)

Traditionally, the FCC has used the tax certificate in the radio broadcast area. It has granted tax certificates in order to promote the "one to a market" rule and promote minority ownership of broadcast facilities.[21] However, the FCC has also applied Section 1071 tax certificates to entities that are not properly classified as "radio broadcast stations." In Telocator Network of America, 58 RR 2d 1443 (1985), recon. dismissed, 1 FCC Rcd 509 (1986), the Commission decided to grant tax certificates for sale or exchange of nonwireline cellular partnership interests in Cellular markets 31 through 90. The Commission noted: "In adopting the cellular lottery procedures, we recognized that even under our modified licensing scheme, settlements among competing cellular applicants would speed the initiation of cellular service to the public, and we accordingly determined that retention of our policy of encouraging settlements continued to serve the public interest." 58 RR 2d at 1446. However, the Commission was faced with a problem. Section 1071 of the Tax Code (" the Code") limited the grant of tax certificates to "radio broadcast stations". However, the Commission looked to the legislative intent of the statute and found that the primary intent of the legislation was to promote a competitive market structure. The Commission determined that: "[c]onsideration of the dramatic and substantial changes that have taken place in telecommunications since the language of 1071 was first enacted argues in favor of expansively construing the phrase 'radio broadcasting' to facilitate the effectuation of the Commission's pro-competitive

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21 See In re Reexamination of the Commission's Comparative Licensing, Distress Sales and Tax Certificate Policies Premised on Racial, Ethnic or Gender Classifications, 3 FCC Rcd 766 (1988); In Re Issuance of Tax Certificates, 59 FCC 2d 91 (1976); Public Notice, 14 FCC 2d 827 (1956).